SILICULARIA, A NEW GENUS OF CRUCIFERAE, WITH NOTES ON RELATED GENERA.

By R. H. Compton.

In the mountains of the western Cape Province, and particularly in the Cederberg and Cold Bokkeveld areas of the Ceres and Clanwilliam Divisions, there occur four shrubby genera of Cruciferae characterised by their slender virgate, sparingly leafy, genistoid growth. Three of these genera, viz. Brachycarpaea, Cycloptychis and Schlechteria, have been described up to the present, and a fourth genus, Silicularia, is now added. The similarity in habit of these plants (which is also shared to some extent by certain species of Heliophila) does not extend to their fruits and seeds, on which basis, as is usual in the Cruciferae, the various genera are mainly separated.

To the description of *Silicularia sigillata* below are appended notes on the other genera, as well as on the related genus Thlaspeocarpa.

SILICULARIA Compton gen. nov.

Genus Cruciferarum-Isatidearum adhuc monotypicum. *Fructus* orbiculato-ellipticus, planus, valvis concavis, reticulato-rugosis, erostratus, eseptatus. *Semen* unum, orbiculatum, complanatum, exalatum. *Cotyledonae* transverse conduplicatae.

Distinguished from Cycloptychis by the siliculae which contain only one central seed, though the ovary is normally biovulate, and are devoid of both beak and septum.

Silicularia sigillata Compton sp. nov.

Fruticulus anguste virgatus, omnino glaber. *Caules* teretes, rigidi. *Folia* pauca, linearia vel angustissime spathulata, integra. *Flores* numerosi, in racemis ebracteatis pedicellati. *Sepala* erecta, convexa, oblonga, obtusa. *Petala* explanata, late spathulata, obtusa. *Antherae* obtuse sagittatae. *Ovarium* lanceolatum, 2-ovulatum, stylo breve, stigmate globoso. *Silicula* orbiculato-elliptica, valvis externe concavis, reticulato-rugosis: desunt septum rostrumque. *Semen* solitarium, complanatum, exalatum.

Habitat. Cape Province. Ceres Division: Ceres Wild Flower Show, Oct. 1932, *Compton* 4144: De Keur, 27 Sept. 1936, *Compton* 6491; 1 Oct 1944, *Compton* 16221. (*Type*, in Herb. Nat. Bot. Gdns.): top of Gydo Pass, 27 Sept. 1936, Lewis s.n.: Ertjesland Kloof, 28 Sept. 1944, *Compton* 16092.

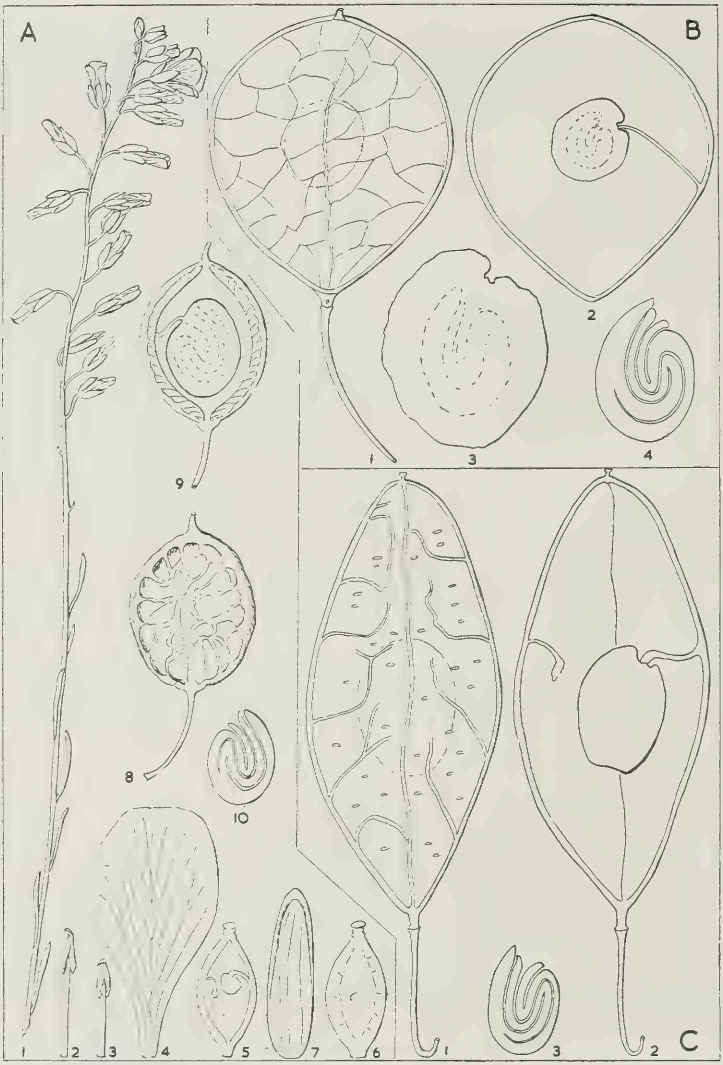

FIG. 1. A. *Silicularia sigillata* Compton. 1. Branch, nat. size. 2. Long stamen × 5. 3. Short stamen × 5. 4. Petal × 5. 5. Gynaecium with one carpel wall removed × 5. 6. Gynaecium × 5. 7. Sepal × 5. 8. Fruit × 5. 9. Fruit with one valve removed × 5. 10. Embryo × 5. *Compton* 16221.

B. *Thlaspeocarpa capensis* C. A. Smith. 1. Fruit × 2½. 2. Fruit with one valve removed × 2½. 3. Seed × 5. 4. Embryo × 5. *Compton* 3755.

C. *Schlechteria capensis* Bolus. 1. Fruit × 5. 2. Fruit with one valve removed × 5. 3. Embryo × 5. *Esterhuysen* 21730. (*Del.* W. F. Barker.)

A slender virgate shrublet, branching mostly at the base, glabrous in all parts, 30—50 cm. high. *Stems* terete, rigid, smooth, striatulate. *Leaves* few, scattered, erect, linear or very narrowly spathulate, entire, 15—25 mm. long, 1.5—2 mm. wide, the apex and margins slightly incurved. *Flowers* in a long lax ebracteate raceme up to c. 15 cm. long, erect, spreading or deflexed. *Pedicels* slender, ebracteate, curved, c. 5 mm. long. *Sepals* erect, c. 5 mm. long, convex externally, oblong, obtuse, the antero-posterior pair slightly gibbous at the base, the lateral pair obtuse, cucullate, membranous at the tip. *Petals* spreading, white or pale pink, membranous, broadly spathulate, obtuse, c. 8 mm. long, 4 mm. wide. *Filaments* 3 mm. long, tapering slightly from base to apex. *Anthers* obtusely sagittate. *Ovary* lanceolate, somewhat flattened, 2 mm. long, 1 mm. broad, 2-ovulate: style short, stigma globuse. *Fruit* orbicular-elliptic, c. 4 mm. long, 3.5 mm. wide, flattened, the valves concave, reticulate-rugose, without septum, containing one seed and one sterile ovule. *Seed* with long funicle attached to the edge of the valve, orbicular, flattened, wingless, 2 mm. diameter, the testa membranous, the embryo with transversely conduplicate cotyledons.

The fruit has vestiges of a very thin septum around the inner edges of the sutures, though the middle is quite open. It may be that the septum is continuous in the very young stages of the ovary, and that it ruptures as the fruit enlarges, leaving only a marginal fringe; but of this I have not been able to satisfy myself.

This broom-like Crucifer has only been found in a limited area of the Cold Bokkeveld, viz. at De Keur, near the top of the Gydo Pass and in the adjoining Ertjesland Kloof (the locality of the Ceres Wild Flower Show specimens not being exactly known, though within the Ceres Division). It grows in crevices and on ledges of Table Mountain Sandstone rocks at an altitude of about 3000 ft. It frequently fails to produce fruits, and in this condition can easily be mistaken for a Cycloptychis or Brachycarpaea. It has an attractive appearance owing to the large number of flowers which are open simultaneously. The corollas are white or pale pink. It flowers in September and October, the fruits, when formed, being mature in November: they are probably indehiscent, though the valves can be split apart with a needle. The specific name refers to the thick valves of the silicula with their curiously impressed pattern.

Brachycarpaea DC.

Little will be said here about this genus which is the most widely spread of the group. It is commonly understood to consist of two species: *B. varians* DC., mainly occurring in the western Cape Table Mountain

Sandstone formation, is a very attractive plant, grown at Kirstenbosch and well worth more extended cultivation: *B. laxa* Sond. has a much wider range, extending from Namaqualand through all the coastal Divisions and some inland ones as far as Bredasdorp, and showing a greater degree of variability, as might be expected. Both species were divided into varieties by Sonder (Flora Capensis), but further study, especially of *B. laxa*, in relation to habitat is necessary. The form from the Southern Cape Peninsula (which Sonder apparently did not see), should almost certainly be distinguished from those of Montagu, Laingsburg, Clanwilliam, van Rhynsdorp and Namaqualand.

Cycloptychis E. Mey.

Dr. E. P. Phillips (Gen. S. A. Fl. Plants, ed. II, p. 347, 1951) states that this genus comprises three species. Of these *C. virgata* E. Mey is the type. The others are presumably *C. polygaloides* Sond. which I believe to be a Heliophila (see below), and *C. Marlothii* O. E. Schultz, on the type material of which Phillips has written "not genus Cycloptychis", but which I think is best retained in that genus.

Sonder's type of "*C. polygaloides*" (Fl. Cap. I, p. 34, 1859) was collected by Zeyher at Tulbagh in November. I have not seen the type specimen, but the plant Sonder describes is very unlike *C. virgata* in habit, leaf characters etc., and though the ovary is said to be rostro-acuminate, the ripe fruit, on which generic discrimination must chiefly depend, was unknown. There is nothing in Sonder's description, in fact, to separate the plant with certainty from Heliophila, a more or less pronounced beak being frequent in that genus.

Schlechter (Engl. Jahrb. 27,136, 1899) described a Heliophila which he had collected on the Cold Bokkeveld at 4000 ft. alt. on 9 Sept. 1896 (*Schltr.* 8929) as *H. nubigena*, and this plant has been collected on many occasions since. One of the gatherings is by A. Bolus (*Bolus* 6349) from the slopes of the Winterhoek Mts., Tulbagh, 5500 ft., Oct. 1896—that is, reasonably close to Zeyher's *Cycloptychis polygaloides* locality. The same plant was collected by Miss E. *Esterhuysen* (1305) in Duivel's Kloof, Great Drakenstein Mts. 2/3000 ft. on 6 Oct 1935, by myself (*Compton* 9758) on the Audensberg, Worcester Division, 6 Oct. 1940 and by Miss *Esterhuysen* on Audensberg summit on the same day, on a Mountain Club Meet. Since then it has been collected repeatedly by Miss Esterhuysen in surrounding mountain localities, viz. Chavonnesberg, 4 Oct 1942 (8187); Keeromsberg 5/6000 ft., 8 No. 1943 (9300); Milner Ridge Peak 4/6000 ft., 11 Nov. 1943 (9335); Brandwacht Mt. 6000 ft., 26 Nov. 1944 (11015); Duivel's Kloof (again) 14 Sept 1947 (14043);

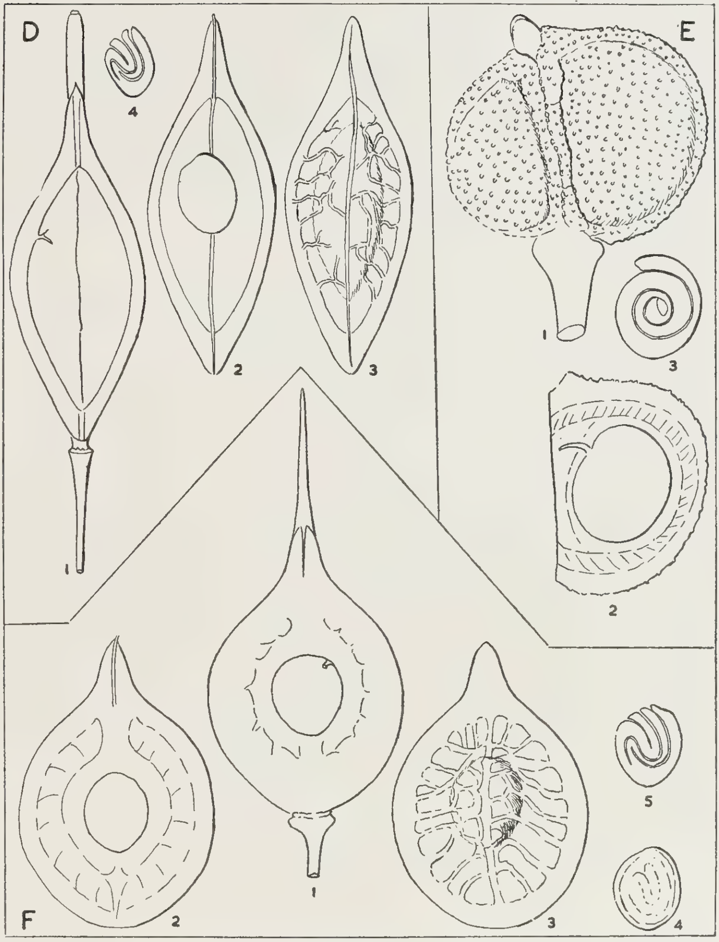

FIG. 2. D. *Cycloptychis Marlothii* O. E. Schultz. 1. Septum × 5. 2. Outer carpel wall, from inside × 5. 3. Outer carpel wall, from outside × 5. 4. Embryo × 5. *Esterhuysen* 12716.

E. *Brachycarpaea varians* DC. 1. Fruit × 5. 2. One carpel with one wall removed × 5. 3. Embryo × 5. *Henderson* 1006.

F. *Cycloptychis virgata* E. Mey. 1. Septum × 5. 2. Outer carpel wall, from inside × 5. 3. Outer carpel wall, from outside × 5. 4. Seed × 5. 5. Embryo × 5. *Leipoldt* 3900. (*Del.* W. F. Barker.)

Chavonnesberg (again), foot of cliffs, 5000 ft., 3 Oct. 1948 (14595); Wemmershoek Peak 5500 ft., 3 Nov. 1951 (19199*a*).

Schlechter's *H. nubigena* has a villous pedicel, calyx and fruit. In his description he states that the ovary is 1—2-ovulate. In fruits which I have dissected there are 4 ovules, of which only one enlarges: a well-marked continuous septum is present, and this is left spread between the persistent margins of the fruit when the two valves fall off. A drawing by Miss M. Walgate seems to indicate that occasionally, at any rate, two ovules may mature. Material is scanty and I have been unable to determine the form of the mature embryo, though I should be greatly surprised if it were conduplicate.

These plants agree closely with Sonder's description of *Cycloptychis polygaloides*, and I am convinced of their identity. If I am right, and if the plant belongs rather to the genus Heliophila, its name would become *Heliophila polygaloides* (Sond.) Compton. If this be accepted, Schlechter's name *H. polygaloides* for a different, though related plant, *Schltr.* 8900, must be abandoned and a new name found: I propose to call it *Heliophila nubigenoides* Compton nom. nov.

The nomenclature thus becomes:

Heliophila polygaloides (Sond.) Compton non Schlechter, comb. nov. (=*Cycloptychis polygaloides* Sond.)

Heliophila nubigenoides Compton nom. nov. (=*H. polygaloides* Schltr.)

There remains one other plant which has been placed in Cycloptychis, where I propose to leave it, in spite of Phillips' doubts on the matter. This is *C. Marlothii* O. E. Schultz (in Engl. Bot. Jahrb. 66, p. 97, 1933), founded on *Marloth* 3362, collected in the Cold Bokkeveld, 1000 m. alt., in flower, in October 1903. Through the kindness of Dr. R. A. Dyer, chief of the Division of Botany and Plant Pathology, I have been enabled to examine Marloth's type specimen in the National Herbarium, Pretoria. As far as I can ascertain it has only been collected once since, viz. by Miss Esterhuysen, who obtained fruiting specimens on the east spur of the Hondverbrand Ridge, Southern Cederberg, on 21 April 1946. There are no flowers on these specimens (*Esterhuysen* 12716 in the Kirstenbosch and National Herbaria, 12719*a* in the Bolus Herbarium), and the fruits are slightly narrower than in the type, but I cannot doubt their specific identity.

Schlechteria Bolus.

This monotypic genus was founded (Bolus in Engl. Bot. Jahrb. 24, p. 455, 1897) on *Schltr.* 8765 from the Koudeberg, near Wupperthal, 30 August, 1896, the single species being named *S. capensis* Bolus. I have examined the type in the Bolus Herbarium, which is accompanied by Dr. Bolus' original MS. description and drawings.

Fifty years elapsed before this plant was again collected, when it was found by Miss E. *Esterhuysen* 13130 at Duivelsgat in the Sneeuwberg area of the Cederberg on 11 October 1946: her material shows young and older fruits and only one flower, rather larger than described by Bolus, the whole plant being more leafy and better grown. Next year she collected it again (*Esterhuysen* 13803) in a shady rock gully in the Cederberg Tafelberg at 6000 ft. on 26 Feb. 1947: in this gathering also there were young and older fruits but no flowers. While this paper was being written Miss Esterhuysen again brought in specimens (*Esterhuysen* 21730) from Pakhuis Peak, Cederberg, between rocks at 3500 ft. alt, 6 Sept. 1953: this bore mature but still green fruits with fully formed seeds: a very few flowers were also present. It seems clear from the records that the plant has no well-defined flowering season and that the perianth and androecium must be very fugacious.

Miss Esterhuysen's material enables corrections to be made in the original description of the plant. The fruits in *Schltr.* 8765 are now seen to be immature, and the embryo had not attained its full size and final type of folding. Bolus' description reads "embryo curvus: cotyledones accumbentes, lineares". The Esterhuysen plants carry fully developed seeds, flattened like a biconvex lens, about 4 mm. in diameter, completely filled with a conduplicately folded embryo.

In another important respect the printed description of Schlechteria requires correction. It is there stated that the ovary is 3-locular—a very unusual feature in the Cruciferae. In Bolus' original manuscript, confirmed by the drawings, however, it is described as 2-locular, the printed version being obviously in error. The mistakes in the printed description have been perpetuated by Phillips (Genera Fl. Plants ed. II, p. 353), resulting in Schlechteria being placed away from its true affinity.

Bolus' drawings accompanying the type specimens include a "diagrammatic section" of the ovary showing a very thin septum with two ovules on each side of it. The description reads "siliqua septo membranaceo tenuissimo obliterato 1-locularis abortu 1-sperma". I have been unable to find a septum in any of the fruits examined, and if a vestigial membrane should be present in the young state it must disappear very early in development.

Thlaspeocarpa C. A. Smith.

In the Flora Capensis vol I, p. 35, 1859, Sonder described a monotypic genus under the name Palmstruckia with the intention of preserving

Palmstruck's name, which had been abandoned in the case of a Scrophulariaceous genus to which it had originally been applied. International Rules, however, prohibit recourse to this method of commemoration, and a new name had to be found for the Cruciferous plant in question: this was done by Mr. C. A. Smith (in Kew Bull. 1931, p. 156) who chose the name Thlaspeocarpa, the single species becoming *T. capensis*.

This plant, destined to considerable confusion as regards name and identity (see Smith loc. cit.) was collected by Thunberg in November 1774 on the "Onderste Roggeveld". Smith states that this is "near the southern limits of the Calvinia Division": but Thunberg had mentioned that this district is so called, not because it lies lower than the other Roggevelds. but because it is furthest from the Cape. (See M. C. Karsten. Journ. S.A. Bot. vol V, p. 148, 1939, whose map shows it east of the Hantam Mountains, across the Fish River, this corresponding with the maps of Lichtenstein, Barrow and Burchell.)

Thunberg's plant was confused with *Peltaria capensis* L.f. in the Schultes Fl. Cap. p. 490, but was recognised as distinct by Sonder.

After Thunberg's original discovery it remained botanically unnoticed until Bolus collected a Namaqualand specimen in October 1883 "in stony places, Kasteel Poort, near Klipfontein, 3000 ft." On this specimen (*Bolus* 6502 in Herb. Bolus) he wrote—"Thunberg's type of *Peltaria capensis* was sent from Upsal to Kew for the express purpose of comparing with this in 1885. Mr. N. E. Brown reports that he has *no doubt* they are the same. Thunberg's specimen had only filiform leaves. but his specimen consisted only of the upper part of the plant and the leaves were reduced to bracts. The fruit in his was *mature* and ½ an inch in diameter."

Thlaspeocarpa was again collected by J. T. Anderson at Klipfontein, Namaqualand in August 1890 (*Guthrie no.* 2325 in Herb. Nat. Bot. Gdns., determined by Bolus). It has been gathered twice near Nieuwoudtville—a locality not so remote from the Roggeveld as is Namaqualand—by *Leipoldt* (889. Karoo soil near Willems River 3200 ft., not very common, Sept., in Herb. S.A. Museum), and by Miss M. *Lavis* (*in Herb. Bolus* 19828, Klipkoppies about 6 miles N.E. of Nieuwoudtville, c. 2500 ft., in red clay, Sept. 1930). In Sept. 1931 I found it growing in sandy soil at Constable, Laingsburg Division, 3000 ft. (*Compton* 3755 in the Kirstenbosch and Bolus Herbaria.)

It may be possible to distinguish two species among these widely separated gatherings. *Compton* 3755 agrees with Thunberg's plant in the dimensions of the fruit as given by Sonder: the Lavis plant also agrees with these in size of fruit and width of leaflets: Leipoldt's plant is apparently the same. *Bolus* 6502 has narrower leaflets and smaller fruits than Thunberg's, which Bolus apparently attributes to immaturity.

The Compton plant has a pilose calyx and pedicel and its colour is reddish: other gatherings have glabrous calyx and pedicels and white petals.

Eventually it may be found that the Namaqualand plants belong to a distinct species, while the Lavis, Leipoldt and Compton gatherings (neglecting differences of colour and hairiness) are the true *T. capensis*. It may be remarked that considerable differences in habitat occur amongst them, some growing in stony places, some in red clay and some in sand. More material of this curious Crucifer, with its striking Lunaria-like fruits and its rather wide distribution, is very desirable.